



# The first female specimen of the poorly known Arfak Stout-tailed Snake, *Calamophis sharonbrooksae* Murphy, 2012 (Serpentes: Colubroidea: Homalopsidae), from the Vogelkop Peninsula of Indonesian West New Guinea, with comments on the taxonomic history of primitive homalopsids

<sup>1</sup>Mark O'Shea and <sup>2</sup>Hinrich Kaiser

<sup>1</sup>Faculty of Science and Engineering, University of Wolverhampton, Wulfruna Street, Wolverhampton, WV1 1LY, UNITED KINGDOM and West Midland Safari Park, Bewdley, Worcestershire DY12 1LF, UNITED KINGDOM <sup>2</sup>Department of Biology, Victor Valley College, 18422 Bear Valley Road, Victorville, California 92395, USA and Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20013, USA

**Abstract.**—The recent resurrection of *Calamophis* Meyer, 1874, type species *C. jobiensis*, from the synonymy of *Brachyorrhos* Kuhl in Schlegel, 1826, and the description of three new species of *Calamophis*, have changed concepts of homalopsid diversity in the Vogelkop Peninsula of West New Guinea. Both *Brachyorrhos* and *Calamophis* are now accepted to comprise four species each and are considered representatives of a unique fangless, nonvenomous, terrestrial to semi-fossorial, homalopsid lineage. With the original and only specimen of *C. jobiensis* lost, the genus *Calamophis* is now characterized by only six specimens (4 ♂♂, 2 ♀♀), comprising holotypes and paratypes of the remaining three species; in each case the species is defined only by specimens of a single sex. We here present the description of the first female specimen of *C. sharonbrooksae*, the largest specimen of the genus discovered so far, which exhibits a slightly longer body (96% of SVL vs. 91%) and a higher ventral scale count (158 vs. 149 or 150) than the two males, combined with a significantly shorter tail (4.4% of total length vs. 8.6%) and a lower subcaudal scale count (12 pairs vs. 17 or 19 pairs). This is the first time both sexes of a *Calamophis* species have been available for comparison. The specimen is also the first mainland Papuan *Calamophis* documented outside the administrative boundaries of the Manokwari Residency, suggesting a wider distribution for the genus than previously thought.

**Keywords:** Homalopsidae, *Calamophis sharonbrooksae*, *Brachyorrhos*, West Papua Province, Vogelkop Peninsula

**Citation:** O'Shea M and Kaiser H. 2016. The first female specimen of the poorly known Arfak Stout-tailed Snake, *Calamophis sharonbrooksae* Murphy, 2012 (Serpentes: Colubroidea: Homalopsidae), from the Vogelkop Peninsula of Indonesian West New Guinea, with comments on the taxonomic history of primitive homalopsids. *Amphibian & Reptile Conservation* 10(2) [General Section]: 1–10 (e122).

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**Received:** 15 March 2016; **Accepted:** 06 May 2016; **Published:** 26 August 2016

## Introduction

*Calamophis* Meyer, 1874 was created as a monotypic subgenus of *Calamaria* H. Boie in F. Boie, 1827 with type species *C. jobiensis* Meyer, 1874, but only four years later *Calamophis* was synonymized with *Brachyorrhos* Kuhl in Schlegel, 1826 by Peters and Doria (1878).

*Brachyorrhos* Kuhl in Schlegel, 1826 by Peters and Doria (1878). Boulenger (1893) later synonymized *B. jobiensis* with *B. albus* (Linnaeus, 1758). This resulted in a monotypic *Brachyorrhos*, with no further mention of *Calamophis* for over a century.

**Correspondence.** Emails: <sup>1</sup>oshea@markoshea.info (corresponding author); <sup>2</sup>hinrich.kaiser@yvc.edu

### The phylogenetic position of *Brachyorrhos*:

Beyond any issue with *Calamophis*, the taxonomic position of *Brachyorrhos* within the Colubroidea (advanced snakes) remained uncertain, and the genus appeared as part of the Coronellae (Boie, 1827), Calamaridae (Günther, 1858), Colubridae (Boulenger, 1893; Williams and Wallach, 1989), and Natricidae (Dowling and Duellman, 1978). McDowell (1987) proposed that despite its terrestrial and fossorial existence, combined with its lack of fangs, *Brachyorrhos* belonged to the aquatic, rear-fanged, piscivorous-carcinophagus Homalopsidae, with which it shared viviparity and morphological similarities of the hemipenes, skull, and vertebrae. Although this placement was generally accepted (Burbrink and Crother, 2011; Zaher et al., 2009), *Brachyorrhos* was considered *incertae sedis* within the Homalopsidae (Lawson et al., 2005; Murphy, 2007) until its phylogenetic position, as the sister-taxon to all the aquatic, rear-fanged taxa, was established by molecular analysis (Murphy et al., 2011). *Brachyorrhos* is now viewed as representing a basal, terrestrial-fossorial, fangless, nonvenomous, vermivorous lineage within the Homalopsidae (Murphy, 2012; Murphy and Voris, 2014; Wallach et al., 2014).

***Calamophis* or *Brachyorrhos*?** Finally, after more than a century of what Murphy et al. (2012) referred to as “a deeply entwined and confused nomenclatural history,” *Calamophis* was resurrected (Murphy, 2012) for a group of snakes from the Vogelkop (Bird’s Head) Peninsula and Schouten Islands of northwestern New Guinea. The snakes included sharing a series of pholidotic characteristics, including a single internasal, a single postocular, and 19 dorsal scale rows that reduce to 17 anterior to the vent. *Brachyorrhos* was reserved for snakes possessing paired internasals, paired postoculars, and 19 scales at midbody without reduction in number anterior to the vent. *Brachyorrhos sensu stricto* was therefore confined to the Moluccan Islands (Maluku and North Maluku Provinces, Indonesia) and is no longer monotypic, owing to the resurrection of two previously synonymized taxa and the description of a new species (Murphy, 2012). *Brachyorrhos* therefore comprises *B. albus*, a species found on Seram, Ambon, Haruku, Nusa Laut, Saparua, and Pulau Bisa; *B. gastrotaenius* (Bleeker, 1860) on Buru; *B. raffrayi* (Sauvage, 1879) on Ternate; and *B. wallacei* (Murphy et al., 2012) on Halmahera.

**The distribution of *Brachyorrhos*:** Murphy et al. (2012) also provided tantalizing records for “unresolved *Brachyorrhos*” that may include potential second species for both Seram and Buru. *Brachyorrhos* of undetermined taxonomy have also been reported from Morotai (de Jong 1928), Bacan (= Batjan) (Bleeker 1857; Boettger 1903), the Banda Islands (Boettger 1892; 1903), the Aru Islands (Peters and Doria 1878), and Kofiau Island, in the Raja Ampat Islands, Raja Ampat Regency, West Papua

Province, West New Guinea (Murphy et al., 2012). We consider reports of *Brachyorrhos* for the Lesser Sunda island of Timor (Boettger, 1903; Boulenger, 1893; de Rooij 1917; fide Günther 1858; Iskandar and Colijn, 2002; Welch 1988) doubtful, especially since we have conducted an intensive herpetological survey of Timor-Leste, comprising ten phases in 2009–2014 (Kaiser et al., 2011; Kaiser et al., 2013; O’Shea et al., 2012; O’Shea et al., 2015b; Sanchez et al., 2012). We also discount as extremely unlikely the inclusion of Java in the range of *Brachyorrhos* (Boettger, 1903; Boulenger, 1893; Schlegel, 1837), given the almost two centuries of herpetological collecting done there by individual collectors such as Felix Kopstein (1893–1939) and Carel Pieter Johannes de Haas (1895–1949), personnel from the Natuurkundige Commissie voor Nederlands-Indië (Natural Sciences Commission for the Dutch Indies), and subsequently, Pusat Penelitian Biologi, Lembaga Ilmu Pengetahuan Indonesia (Biological Research Centre, Indonesian Institute of Sciences), and the Museum Zoologicum Bogoriense.

**A brief historical review of *Brachyorrhos*:** It is possible the inclusion of Java was due to the accidental mixing of Javanese and non-Javanese specimens in the collections of Heinrich Kuhl (1797–1821), Johan Coenraad van Hasselt (1797–1823), and Heinrich Boie (1794–1827), but see also comments under Sumatran reports below. All three collectors died in the Dutch East Indies (Adler, 2007; 2012; 2014), while collecting specimens for the newly created Natuurkundige Commissie voor Nederlands-Indië. Their collections were reported upon by Hermann Schlegel (1804–1884), and Boie’s elder brother Friedrich (1789–1870), both authors publishing new taxon names but ascribing them to those who actually did the fieldwork (i.e., to Kuhl and H. Boie). Schlegel (1826) listed the genus *Brachyorrhos*, as containing the species *albus*, *dimidiatus* Kuhl, *kuhli* Boie (= *brachyurus* Kuhl), *decussatus* Kuhl, *torquatus* H. Boie, *schach* H. Boie, *badius* H. Boie, and *flammigerus* H. Boie. Friedrich Boie (1827) published an appraisal of *Versuch eines Systems der Amphibien* (Merrem, 1820), in which he included the genus *Brachyorrhos* Kuhl, in the family Coronellae, and provided a numbered list of the species in the genus that included *albus*, *kuhlii*<sup>1</sup>, *flammigerus*, *schach*, *badius*, and *torquatus*. Both he and Schlegel cited H. Boie’s unpublished manuscript *Erpétologie de Java* as the source for many of the new species names, but with H. Boie’s death in 1827 that manuscript was never published; it therefore cannot be considered as a vehicle to make species names available according to the *International Code of Zoological Nomenclature* (ICZN, 1999; 2012). Today these taxa are cited as Boie (or H. Boie) in Schlegel, 1826, or H. Boie in F. Boie, 1827

<sup>1</sup>Friedrich Boie introduced the species name *kuhlii*, which is an unjustified emendation of *kuhli* Schlegel.



**Fig. 1.** Distribution of *Calamophis* on the Vogelkop Peninsula, West Papua Province, and Schouten Islands, Papua Province, West New Guinea. Titles in yellow italic font identify political entities (regencies) that are bordered by yellow lines. Titles in white font label collection localities. Species are indicated by symbols, including *C. sharonbrooksae* (circle), *C. ruuddelangi* (downward triangle), *C. katesandersae* (diamond), and *C. jobiensis* (upward triangle). Scale = 200 km.

(David and Vogel, 1996). The fact that specimens from many parts of the world had become mixed with the Javanese specimens is clearly evident in the composition of *Brachyorrhos*, as the forms *badius*, *flammigerus*, *schach*, and *torquatus* are, in fact, South American taxa that are now placed in the genus *Atractus*. Adler (2012:80) provided additional examples of non-Asian snakes mixed in with Javan specimens in Heinrich Boie's collections. The species described as *Brachyorrhos kuhli*, which was earlier described as *Coluber brachyurus* by Kuhl (1820), is actually a specimen of *Atractus trilineatus* (*fide* Hoogmoed, 1982). This considerable confusion, caused by the arrival at the home country institution of specimens from far and wide, would present adequate grounds to doubt that the specimen of *B. albus* originated from Java.

There have also been several reports of *Brachyorrhos* from Sumatra, summarized in David and Vogel (1996), who questioned its presence there. The author of these reports was Bleeker (1857; 1858a; 1858b; 1860) who reported on specimens collected and donated by E.W.A. Ludeking, from the west coast of Sumatra, and more specifically from Padang and Agam, both in West Sumatra Province. Unfortunately no supporting voucher specimens appear to be extant (Murphy and Voris, 2013). However, a new genus and species of fangless, semi-fossorial homalopsid, *Karnophis siantaris*, was described from a single specimen collected at Siantar, in North Sumatra Province (Murphy and Voris, 2013). This snake is superficially similar in appearance to *Brachyorrhos* and it is perfectly plausible that Ludeking's "*Brachyorrhos*" belong to this or a closely related taxon. The presence of a *Karnsophis*-like homalopsid on at least one of the Sunda Islands may provide an alternative explanation for Javanese reports of *Brachyorrhos* (J.C. Murphy, pers. comm.). We also discount reports of *Brachyorrhos* from southeastern Kalimantan, Borneo, which were questioned by de Rooij (1917), but accepted by de Jong (1928).

**The contributions of Murphy (2012):** Murphy (2012) expanded the resurrected genus *Calamophis* to include three new species, each described from a holotype and a paratype, including *C. katesandersae* (MSNG<sup>2</sup> 56343-1 and 56343-2; ♀♀) from Andai (0°54'58" S, 134°00'25" E), *C. ruuddelangi* (MNHM 5175, BPBM 3850; ♂♂) from Ambuaki (0°46'00" S, 132°57'00" E) and the Kebar Valley (0°43'21" S, 132°50'43" E) in the Tamrau Mountains; and *C. sharonbrooksae* (MSNG 30193-1 and 30193-2; ♂♂) from Mount Arfak (1°05'00" S, 133°58'00" E). All these localities are located in the northeast of the Vogelkop Peninsula (Fig. 1), in Manokwari Regency, West Papua Province, West New Guinea (WNG). *Calamophis jobiensis* is known only from the unsexed<sup>3</sup> holotype (MTKD 1026), collected at Ansus on Yapen (formerly Jobi or Japen) Island (1°42'50" S, 135°49'03" E), in the Schouten Islands of Cenderawasih (formerly Geelvink) Bay, in Yapen Waropen Regency, Papua Province, WNG. This specimen is believed to have been lost during the Allied bombing of Dresden (13–15 February 1945). Iskandar and Colijn (2002) also included Biak Island as a locality for *B. jobiensis*, but Murphy et al. (2012) could locate no supporting specimen. A Papua New Guinea record listed by Iskandar and Colijn (2002) is also in error, as it was based on a specimen of *Mainophis robusta* Macleay, 1877, a synonym of the elapid *Furina tristis* (Günther, 1858) *fide* Shea and Sadlier (1999).

One of us (Mark O'Shea) recently received a loan of Papuan snakes from the Naturhistoriska Riksmuseet, Stockholm, Sweden (NRM, which included a specimen

<sup>2</sup>Specimen numbers are preceded by the collection acronym, as listed by Sabaj Pérez MHE 2014. *Standard Symbolic Codes for Institutional Resource Collections in Herpetology and Ichthyology: An Online Reference. Version 5.0* (22 September 2014). American Society of Ichthyologists and Herpetologists, Washington, DC, USA. [Online]. Available: <http://www.asih.org> [Accessed: 24 November 2014].

<sup>3</sup>Given the low subcaudal scale count of MTKD 1026 provided in the original description, it was most likely a female (see Table 1).

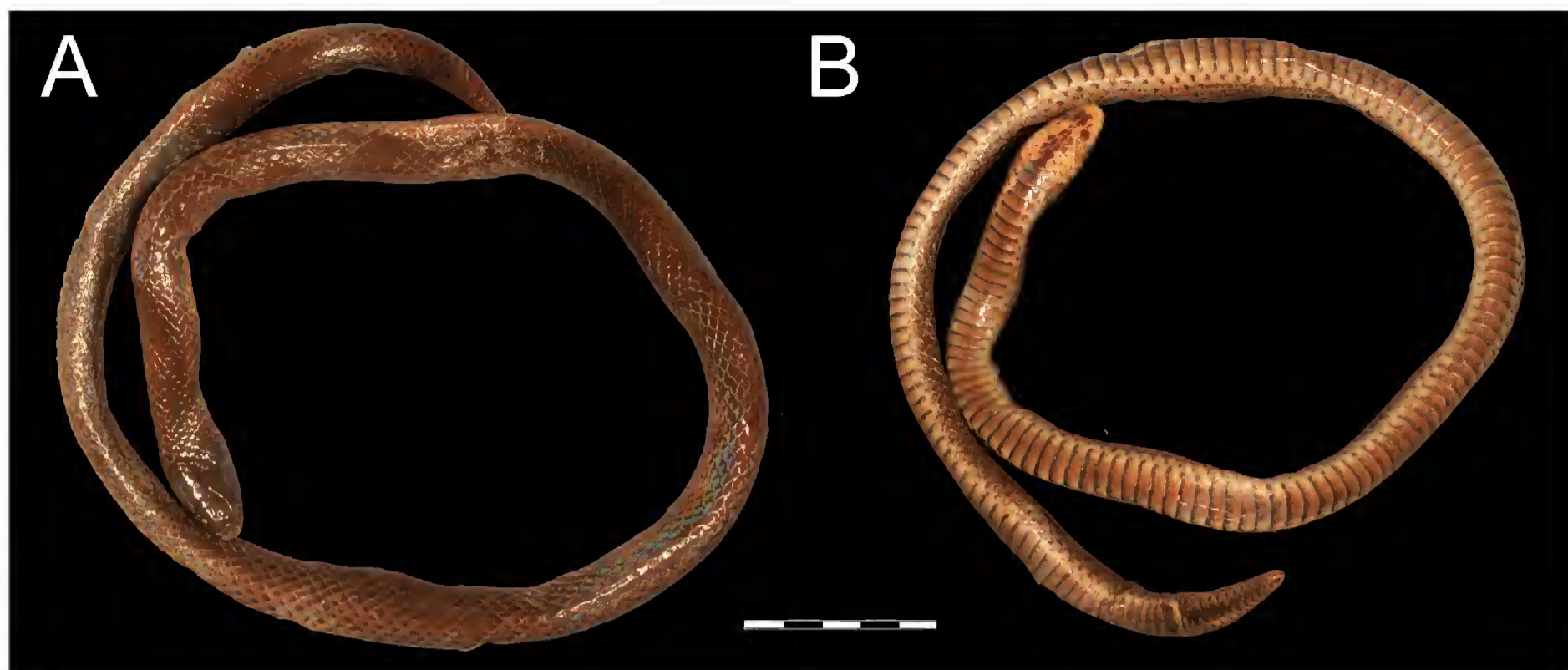


Fig. 2. Dorsal and ventral views of the first known female *Calamophis sharonbrooksae* (NRM 17803). Scale = 25 mm.

purporting to belong to the genus *Brachyorrhos*. Since the most recent taxonomy indicates that it is *Calamophis* and not *Brachyorrhos* that occurs on the Vogelkop Peninsula of West New Guinea, we were able to identify this specimen as a female specimen of *C. sharonbrooksae*. This specimen is the third known exemplar of the species and the only known female specimen, collected approximately 180 km west southwest of the type locality at Mount Arfak. It is described herein.

## Methods

Characters used in our evaluation and comparisons essentially conform to those used by Murphy (2012), whose character nomenclature we follow to simplify comparisons. Measurements of the specimen were taken to the nearest one mm and include snout-vent length (SVL), tail length (TL), and total length (TTL). Scales were counted following (Dowling 1951), with the terminal scale not included in the subcaudal count. Dorsal scales were counted about one head length behind the head, at midbody, and about one head length anterior to the cloaca. Length measurements were obtained using a non-elastic string and running it from the tip of the snout along the ventral medial axis of the body to the cloaca, with special attention to measurement accuracy (Natusch and Shine 2012). Global Positioning System (GPS) coordinates were determined using individual museum records, published species accounts, and Google Earth.

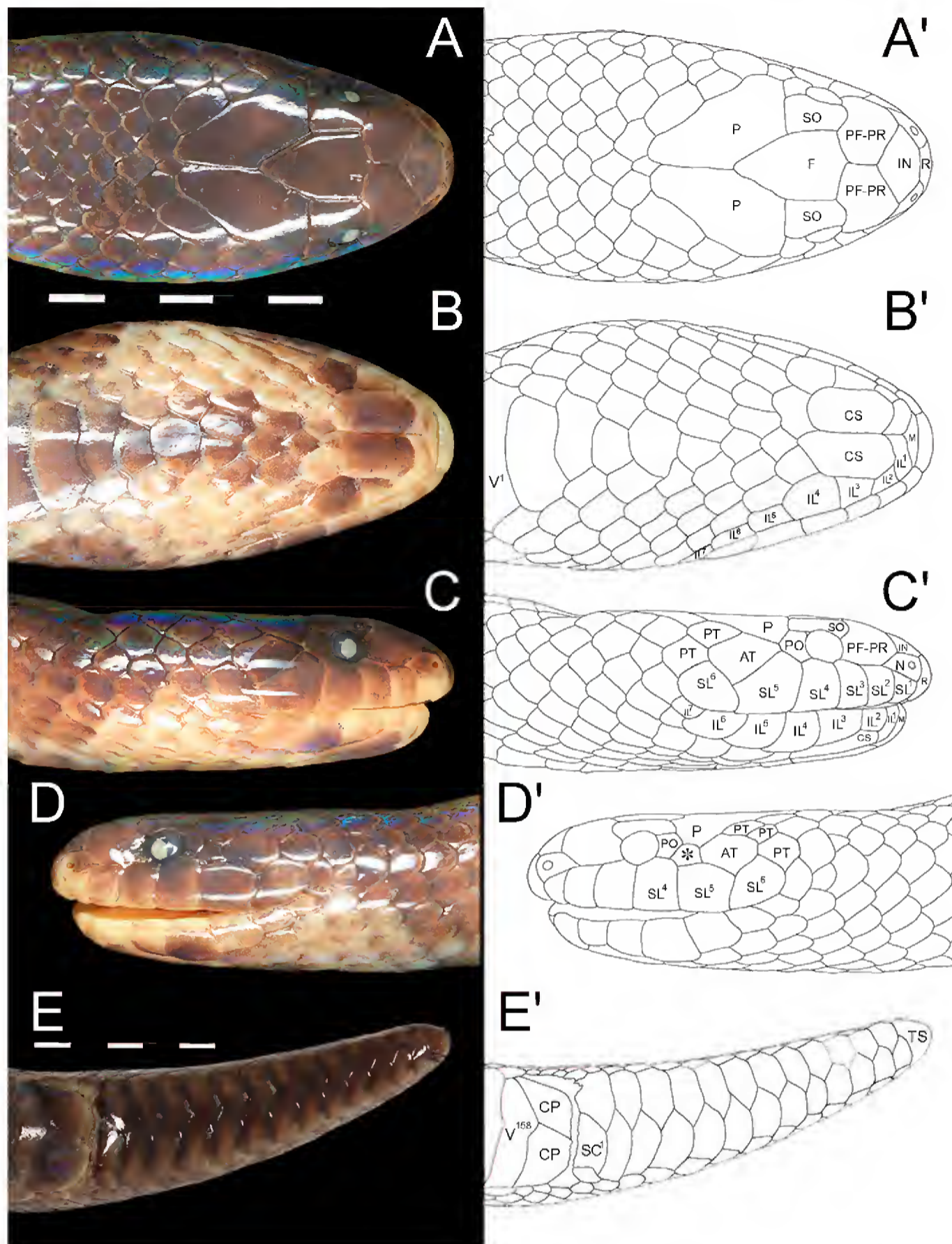
## Results

**Specimen identity:** The specimen in question (NRM 17803) can be unequivocally assigned to *Calamophis sharonbrooksae* based on the following pholidotic characteristics: (1) single internasal scale; (2) single postocular scale; (3) dorsal scale count of 19-19-17; (4) six supralabials; (5) seven infralabials; (6) a single pair of chin shields; (7) 158 ventral scales; and (8) 12 paired

subcaudals. Characters 1–3 distinguish *Calamophis* from *Brachyorrhos*, Characters 4–8 distinguish *C. sharonbrooksae* from its congeners.

### Interspecific variation in scale counts and scale condition:

The NRM specimen (NRM 17803) differs from the males comprising the type series in exhibiting expected higher ventral and lower subcaudal counts, and also by the condition of the anterior temporal scales. *Calamophis sharonbrooksae* is the only member of the genus to possess paired anterior temporal scales, with the lower scale larger than the upper scale, but this character is not uniformly represented across the three known specimens. A pair of anterior temporals is present on both sides of the head in the holotype, but the upper scale is partially fused with the parietal on the left side; it is completely fused, and therefore absent, on the right side in the paratype. The female possesses a single anterior temporal on either side. Also, both parietals are not confined to the dorsal plane, they both curve downwards onto the lateral planes, their lowest points being in line with the centre of the orbit, a situation most similar to the condition on the right side of *C. ruuddelangi* as illustrated by (Murphy, 2012: Fig. 3B). The left side of NRM 17803 also exhibits an additional anomalous scale (Fig. 3D, D'), subequal in size to the postocular, sandwiched between the postocular and the anterior temporal, and between the parietal and the 4<sup>th</sup> and 5<sup>th</sup> supralabials. This scale, which may have been formed by either a fragmentation of the upper portion of the 5<sup>th</sup> supralabial, by a horizontal suture, or by the division of the anterior portion of the anterior temporal, by a vertical suture, prevents contact between the anterior temporal and the postocular. Clearly the condition of the anterior temporal is variable and would therefore appear to be of little taxonomic value in distinguishing between *Calamophis* species. Murphy (2012) also used the tallest supralabial to differentiate between *C. katesandersae* (5<sup>th</sup> supralabial) and *C. ruuddelangi* and *C. sharonbrooksae* (4<sup>th</sup> supralabial), but



**Fig. 3.** Detailed views of the head and tail of the first known female *Calamophis sharonbrooksae* (NRM 17803), presented as both photographic and line-drawn illustrations for improved clarity. (A, A') Dorsal view of the head, illustrating rostral (R), single internasal (IN), fused prefrontal-preocular (PF-PR), frontal (F), paired supraocular (SO), and parietals (P). (B, B') Ventral view of the head, showing a single pair of chin shields (CS), seven infralabials (IL<sup>1</sup>-IL<sup>7</sup>), mental (M), and the first ventral scute (V<sup>1</sup>). (C, C') Left lateral view of the head, additionally illustrating the undivided nasal (N), single postocular (PO), single anterior temporal (AT), two posterior temporals (PT), and six supralabials (SL<sup>1</sup>-SL<sup>6</sup>). (D, D') Right lateral view of the head, illustrating differences in scalation compared to left side, three posterior temporals (PT), and small scale separating the postocular and anterior temporal (\*). (E, E') Ventral view of the tail, showing the final ventral (V<sup>158</sup>), divided cloacal plate (CP), first paired subcaudal (SC<sup>1</sup>), and rounded terminal scute (TS). Scale = 10 mm for Fig. 3A-D and 10 mm for Fig. 3E.

this character also fails with NRM 17803, which has the 5<sup>th</sup> supralabial tallest on the right side, but the 4<sup>th</sup> supralabial on the left side due to the presence of the small anomalous scale. Assuming the situation on the left side to be aberrant, then the tallest supralabial in NRM 17803 would conform to the type series.

**History of NRM 17803:** The female specimen of *C. sharonbrooksae* (NRM 17803) was collected by the Swedish zoologist Sten Bergman (1895–1975) on 6 March 1949 at Atinyu (1°26'04" S, 132°22'58" E), near

Lake Danau<sup>4</sup>, on the Vogelkop Peninsula, Sorong Selatan Regency, West Papua Province, West New Guinea, at an approximate elevation of 260 m (as determined using Google Earth). This specimen also represents the west-

<sup>4</sup>Danau is Bahasa Indonesian for “lake,” so the name of this locality is effectively “Lake Lake.” This sort of name is not unusual in Indonesia: a specimen of *Brachyorrhos raffrayi* was collected at Danau Laguna on Ternate, a location that also translates as Lake Lake. Perhaps even more interesting is the naming of larger areas. The country known as East Timor in English and now called Timor-Leste was called Timor Timur under Indonesian rule (1975–2001). *Timur* is Indonesian for east, *leste* is Portuguese for east, so effectively this country has been called East East since the 16<sup>th</sup> Century.

**Table 1:** Meristic and morphometric data for *Calamophis* spp. Measurements are listed in mm and include snout–vent length (SVL), tail length (TL), and total length (TTL).

Specimen	Sex	SVL	TL	TTL	TL/SVL	TL/TTL
<i>C. jobiensis</i> <sup>1</sup>						
MTKD 1026	♀ <sup>2</sup>	—	—	—	—	—
<i>C. katesandersae</i>						
MSNG 56343-1	♀	215	8	223	0.037	0.036
MSNG 56343-2	♀	157	6	163	0.038	0.037
<i>C. ruuddelangi</i>						
MHHN 5175	♂	232	29	261	0.125	0.111
BPBM 3850	♂	219	27	246	0.123	0.110
<i>C. sharonbrooksae</i>						
MSNG 30193-1	♂	288	26	314	0.090	0.083
MSNG 30193-2	♂	290	28	318	0.097	0.088
<b>NRM 17803</b>	♀	<b>390</b>	<b>18</b>	<b>408</b>	<b>0.046</b>	<b>0.044</b>

<sup>1</sup> Meyer (1874) did not provide measurements for his holotype of *Calamophis jobiensis*.

<sup>2</sup> The sex of this specimen was not reported in the original description and the specimen is now lost. However, given the low number of subcaudals, we presume that it must have been a female.

ernmost record for the genus *Calamophis* and the first mainland record outside Manokwari Regency, suggesting a much broader distribution for the genus in West New Guinea, although it may possibly be confined to the Vogelkop Peninsula and the Schouten Islands (see Discussion).

**Description of NRM 17803 *Calamophis sharonbrooksae*:** A female measuring 390 mm SVL + 18 mm TL = 408 mm TTL (Table 1).

**Physique.**—Moderately stout with a cylindrical body and short tail (4.6% SVL, 4.4% TTL; Table 1) that terminates bluntly, and a rounded head with laterally positioned nostrils and eyes, with elliptical pupils.

**Pholidosis (Body).**—19-19-17 dorsals, all smooth with a high-gloss iridescence, imbricate, lacking apical pits; 158 ventrals; 12 paired subcaudals<sup>5</sup>; divided cloacal plate (Table 2).

**Pholidosis (Head).**—Rostral wider than tall, visible from above; nasals undivided with circular nares, separated by internasal; internasal single, pentagonal, in broad contact with rostral; prefrontals paired, fused with prefrontal and loreal; frontal shield-shaped, half again as deep as wide; parietals paired, longer than wide, extending onto sides of head posterior to the postocular, lowest point level with the center of the orbit; loreal fused with preocular-prefrontal; anterior temporals on the right side comprising a single large scale with narrow contact with the right postocular, on the left side separated from the left postocular by a small anomalous scale, subequal in size to the postocular; posterior temporals comprising two on the right side, three on the left side; supraocular single; preoculars fused with loreal and prefrontal; postocular single; subocular absent; six supralabials, the 3<sup>rd</sup> and 4<sup>th</sup> contacting the orbit; seven in-

<sup>5</sup>The subcaudal counts are 12 on the left side, 13 on the right, resulting in 12 paired subcaudals.

fralabials, the 1<sup>st</sup>–4<sup>th</sup> contacting the chin shields; a single pair of chin shields in broad contact, separated from 1<sup>st</sup> ventral scale by seven gular scales of gradually increasing size.

**Coloration (after 66 years of preservation).**—Dorsally uniform dark chocolate brown body and head with cream pigment confined to lower margins of the supralabials, the infralabials, and the outer gular scales; chin shields, enlarged 4<sup>th</sup> infralabials, and gular scales between chin shields and ventrals chocolate brown, as dorsum. Ventral scales dark brown with lighter lateral edges and dark black margins on the ventral sutures, underside of tail darker than body with black suturing on the subcaudals.

## Discussion

With a length of 390 mm SVL + 18 mm TL = 408 mm, the female *Calamophis sharonbrooksae* from Atinyu (NRM 17803) is the largest known specimen of the genus *Calamophis*. The sole specimen of *C. jobiensis* is no longer extant, and although Meyer (1874) provided scale count data he did not provide SVL, TL, or TTL for this specimen. The largest specimen of *C. katesandersae* is the female holotype (MSNG 56343-1), with 215 mm SVL + 8 mm TL = 223 mm TTL, the largest *C. ruuddelangi* is the male holotype (MNHM 5175) at 232 mm SVL + 29 mm TL = 261 mm TTL, and the previously largest *C. sharonbrooksae* is the male paratype (MSNG 30193-2) with 290 mm SVL + 28 mm TL = 318 mm TTL (Table 1), a specimen probably not selected as the holotype due to extensive damage, resembling fire or acid burns, on the right side of the head.

*Calamophis* appears to occupy parts of western New Guinea from which the widely distributed, and species-rich vermivorous elapid genus *Toxicocalamus*, with 12 species known at last count (O'Shea et al., 2015a), appears to be absent. *Toxicocalamus* occurs throughout mainland New Guinea, excluding the low-lying south-

**Table 2:** Pholidotic characteristics for *Calamophis* spp.

Specimen	Dorsals	Ventrals	Cloacal Plate	Subcaudals	Supralabials (contact orbit)	Infralabials	Postoculars	Chin Shields	Anterior Temporals	Posterior Temporals
<i>C. jobiensis</i>										
MTKD 1026	19-19-17 <sup>1</sup>	164	divided	10 paired	6 (3 <sup>rd</sup> + 4 <sup>th</sup> )	8	single	no data	“irregularly placed” <sup>2</sup>	
<i>C. katesandersae</i>										
MSNG 56343-1	19-19-17	160	divided	9 paired	6 (3 <sup>rd</sup> + 4 <sup>th</sup> )	7	single	one pair	1-1	2-2
MSNG 56343-2	19-19-17	157	divided	9 paired	5(3 <sup>rd</sup> , 2 <sup>nd</sup> +3 <sup>rd</sup> )	7	single	one pair	1-1	2-2
<i>C. ruuddelangi</i>										
MHHN 5175	19-19-17	142	divided	21 paired	6 (3 <sup>rd</sup> + 4 <sup>th</sup> )	7	single	two pairs	1-1	no data
BPBM 3850	19-19-17	143	divided	23 paired	6 (3 <sup>rd</sup> + 4 <sup>th</sup> )	7	single	two pairs	1-1	no data
<i>C. sharonbrooksae</i>										
MSNG 30193-1	19-19-17	150	divided	19 paired	6 (3 <sup>rd</sup> + 4 <sup>th</sup> )	7	single	one pair	2-2	2-2
MSNG 30193-2	19-19-17	149	divided	17 paired	6 (3 <sup>rd</sup> + 4 <sup>th</sup> )	7	single	one pair	2-1	3-3
<b>NRM 17803</b>	<b>19-19-17</b>	<b>158</b>	<b>divided</b>	<b>12 paired</b>	<b>6 (3<sup>rd</sup> + 4<sup>th</sup>)</b>	<b>7</b>	<b>single</b>	<b>one pair</b>	<b>1-1</b>	<b>3-2</b>

<sup>1</sup>Even though Meyer (1874) provided only the middorsal count, we presume that the dorsal pattern conforms to all of the species in the genus and includes the posterior reduction in dorsal number.

<sup>2</sup>Without a specimen it is not possible to determine with certainty why Meyer (1874) considered the pattern of temporal scales irregular. It may well be that one side of the head included a different arrangement from the other, and that Meyer therefore did not consider it wise to include specifics of the arrangement in his list of diagnostic features.

ern Trans-Fly of Western Province, Papua New Guinea (PNG) and neighbouring Merauke Regency of Papua Province, West New Guinea. *Toxicocalamus* also appears to be absent from most of West Papua Province, WNG, with the exception of the Onin or Fak Fak Peninsula, from where four specimens of *Apisthocalamus loennbergii* Boulenger, 1908, currently in synonymy with *Toxicocalamus loriae* (Boulenger, 1898), were collected by the English naturalist Antwerp Edgar Pratt (1852–1924), and a single specimen of *Toxicocalamus stanleyanus* Boulenger, 1917, was collected by the 1920 Dutch New Guinea expedition (de Jong, 1927:306). *Toxicocalamus* is also present on many of the islands to the southeast of PNG (Goodenough, Fergusson, Normanby, Woodlark, Misima, Sudest, and Rossel) and along the northeastern and northern coasts of PNG (Karkar, Tarawai, Walis, and Seleo), with a single specimen reportedly collected from the large island of New Britain, but *Toxicocalamus* has not been collected from the Schouten Islands of Cenderawasih (formerly Geelvink) Bay, despite being relatively well documented from northern and northwestern mainland Papua Province, WNG. We therefore consider it possible that *Calamophis* can only thrive in locations not inhabited by its potentially more successful vermivorous competitor *Toxicocalamus*, but this hypothesis does require more investigation as other biogeographical factors may be the cause for the apparent mutual exclusion of the two genera.

**Acknowledgments.**—The authors would like to thank Glenn Shea (University of Sydney, New South Wales, Australia) for bringing the presence of this specimen to the attention of Mark O’Shea, Sven Kullander and Bodil Kajrup (Naturhistoriska Riksmuseet, Stockholm, Sweden) for facilitating the loan, and Andrew Black (University of Wolverhampton, United Kingdom) for accepting the

loan and making laboratory facilities available to Mark O’Shea. We also wish to extend our gratitude to John C. Murphy for his invaluable comments on an earlier draft of the manuscript and his generosity in sharing his thoughts and opinions regarding the fangless homalopsids. Lastly, the finished manuscript benefited from reviews by Ruud de Lang, Gernot Vogel, and Harold Voris.

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**Mark O'Shea** is a British herpetologist with a specialist interest in the snakes of New Guinea. He wrote *A Guide to the Snakes of Papua New Guinea* (1996) and is currently working on the second edition, expanded to encompass the entire New Guinea region, and he is also the author of four other books. Since 1986 he has made ten expeditions to New Guinea to conduct herpetological fieldwork, capture medically important elapids for snake-bite research, or make films for Animal Planet or the BBC. He has worked in PNG for a variety of organisations from Operation Raleigh to Oxford University's Department of Clinical Medicine, Liverpool School of Tropical Medicine, and the Australian Venom Research Unit, University of Melbourne. Mark also has considerable field experience in other countries in Asia, Africa, and South America, and has been engaged in fieldwork projects since the 1980s. He presented four seasons of the herpetological television series *O'Shea's Big Adventure*, for Animal Planet and Discovery Channel, and has made films with other companies and broadcasters. Mark was awarded the Millennium Award for Services to Zoology by the British Chapter of the Explorers' Club in 2000, and in 2001 was awarded a honorary Doctor of Sciences degree by his alma mater, the University of Wolverhampton, for services to herpetology. He now teaches on the Animal Behaviour and Wildlife Conservation course at the University but he also holds to post as Consultant Curator of Reptiles at West Midland Safari Park, in the United Kingdom. Mark and Hinrich Kaiser (below) are also the leaders of the first comprehensive survey of the herpetofauna of Timor-Leste, Asia's newest country. With ten phases of the project completed since 2009, the team has recorded upwards of 70 species, with more than twenty of these new to science.



**Hinrich Kaiser** is a German-American herpetologist and educator with a research focus on biodiversity and conservation of tropical environments. A passion for scuba diving with experiences in the arctic and the tropics led Hinrich to study marine biology at McGill University and the University of Victoria in Canada. After an inspiring semester learning about amphibians and reptiles in David Green's herpetology class in the Redpath Museum, Hinrich found his true calling and earned his PhD at McGill with a dissertation on the systematics and biogeography of Lesser Antillean frogs. After a Boehringer Ingelheim postdoctoral fellowship at the University of Würzburg, Germany, Hinrich spent five years as Professor of Biology at La Sierra University, Riverside, California, USA, before accepting his current position in the Department of Biology at Victor Valley College in Victorville, California, USA. Hinrich also holds an appointment as Research Associate with the United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA. He currently serves as an Editor-in-Chief of *Herpetology Notes*, but his interests in international affairs and music also led him to memberships on the International Advisory Board of the Foundation for Post-Conflict Development, New York, and on the Advisory Council of the Baltimore Symphony Youth Orchestras. Hinrich also serves as a member of the Executive Committee of the World Congress of Herpetology. His most recent publications have focused on the herpetofauna of Timor-Leste and nearby areas of Wallacea, as well as on the defense of herpetological taxonomy against taxonomic vandalism. His educational specialty is to expose community college students to biological, cultural, and historical experiences overseas, including canopy walks in Brunei, cooking classes in Bali, tracking Komodo dragons on Rinca Island, homestays in Cuba, and surveying Pacific atolls.